Fig.1
PRIOR ART

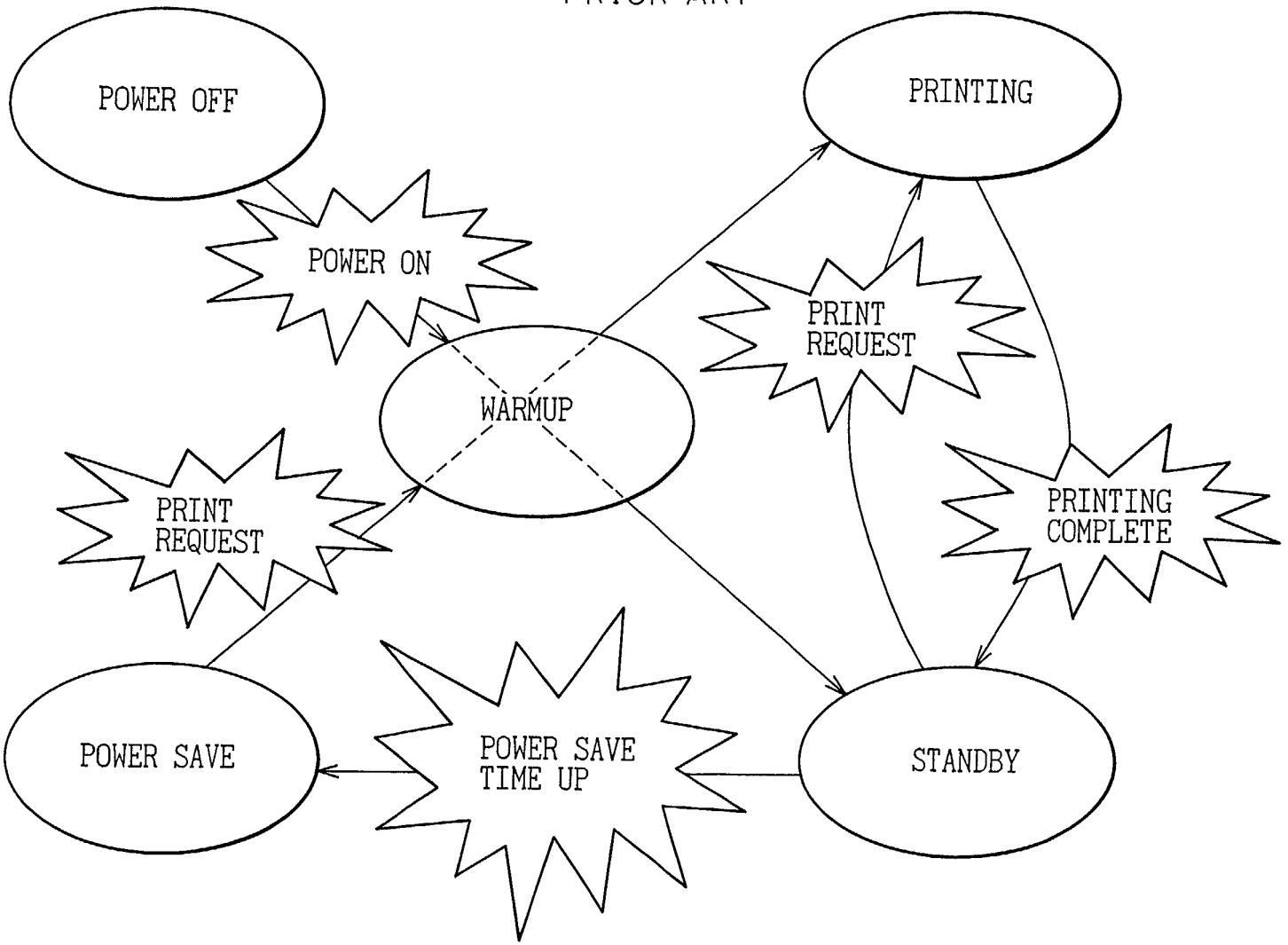
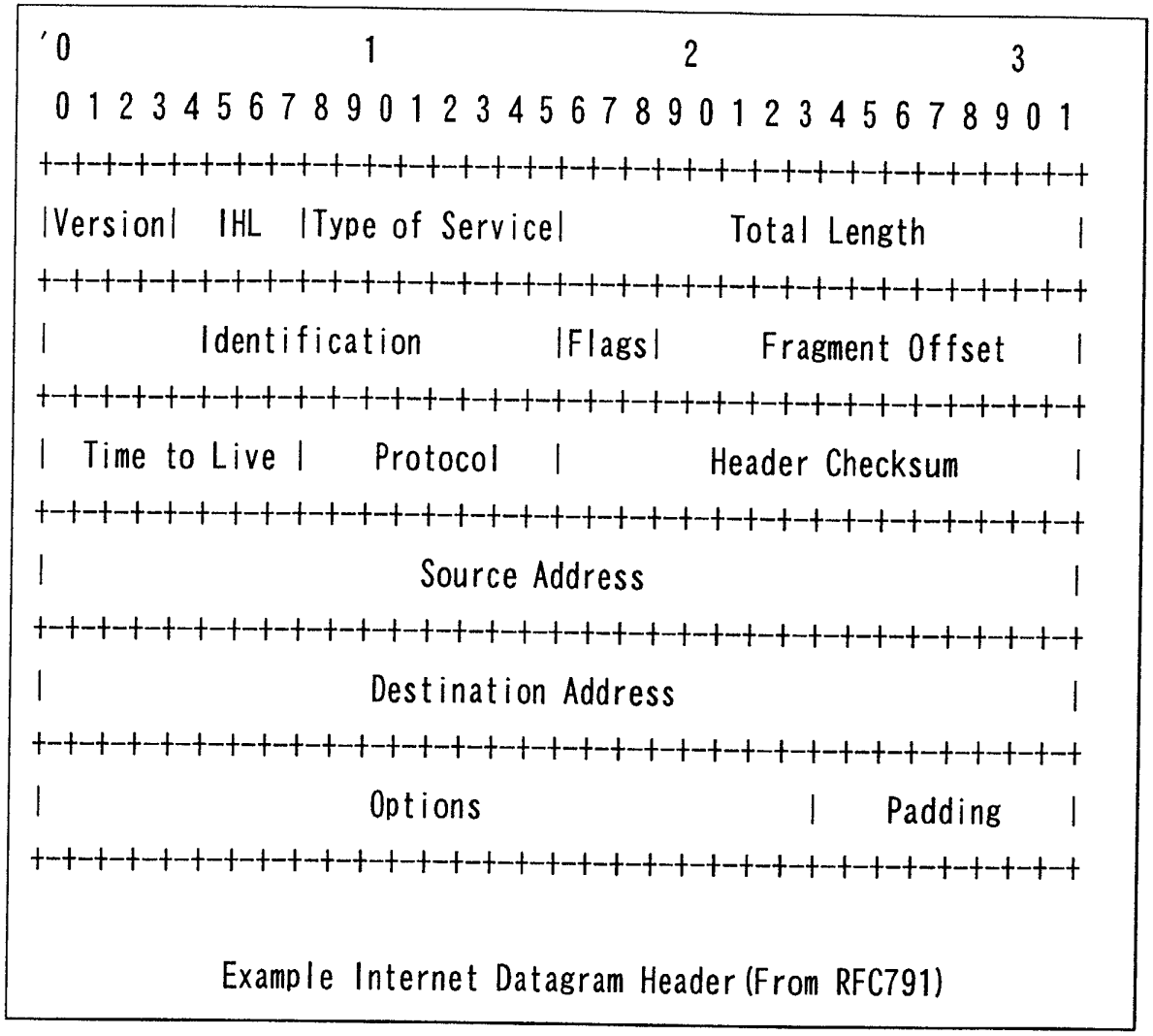


Fig.2

PRIOR ART



Example Internet Datagram Header (From RFC791)

Fig. 3

PRIOR ART

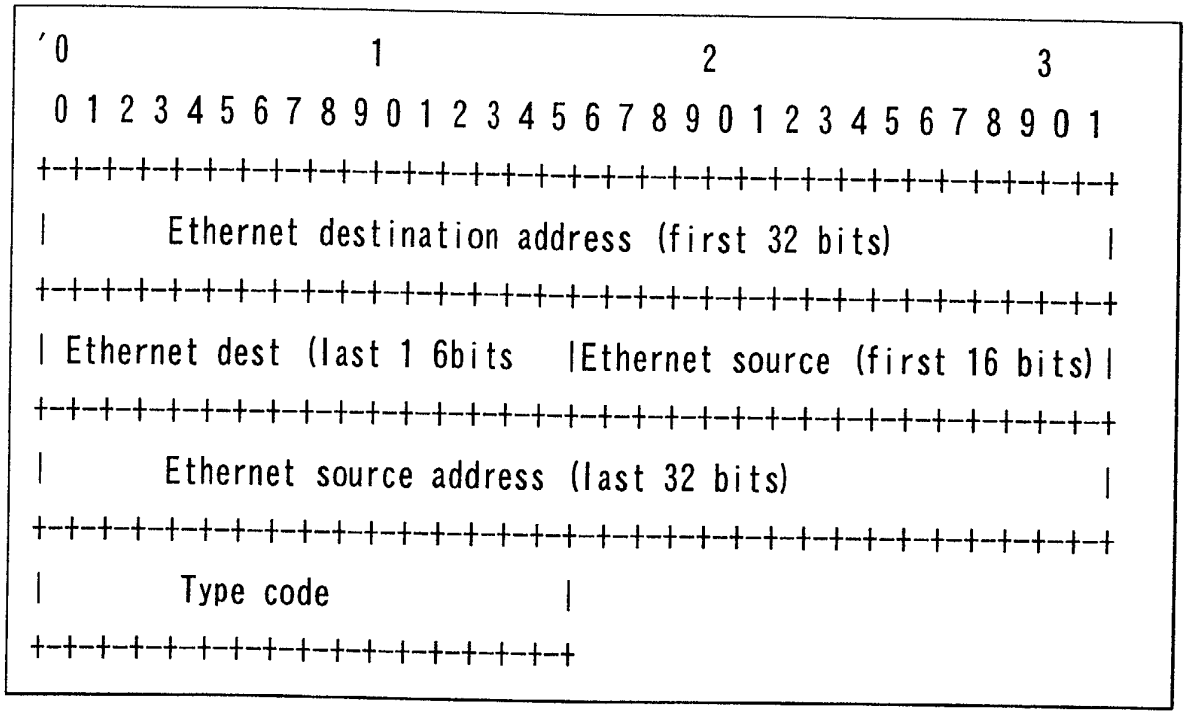


Fig.4

PRIOR ART

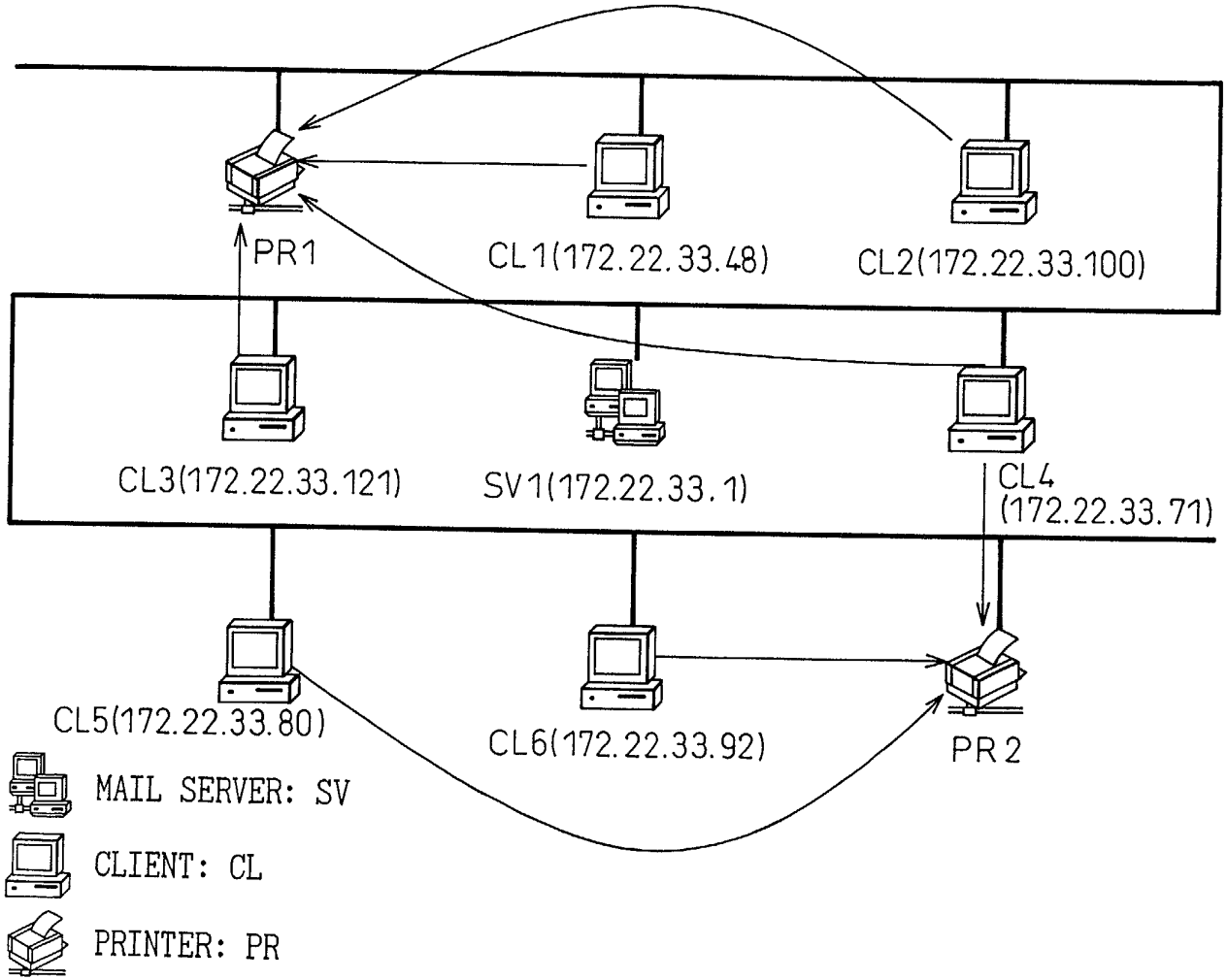


Fig.5
PRIOR ART

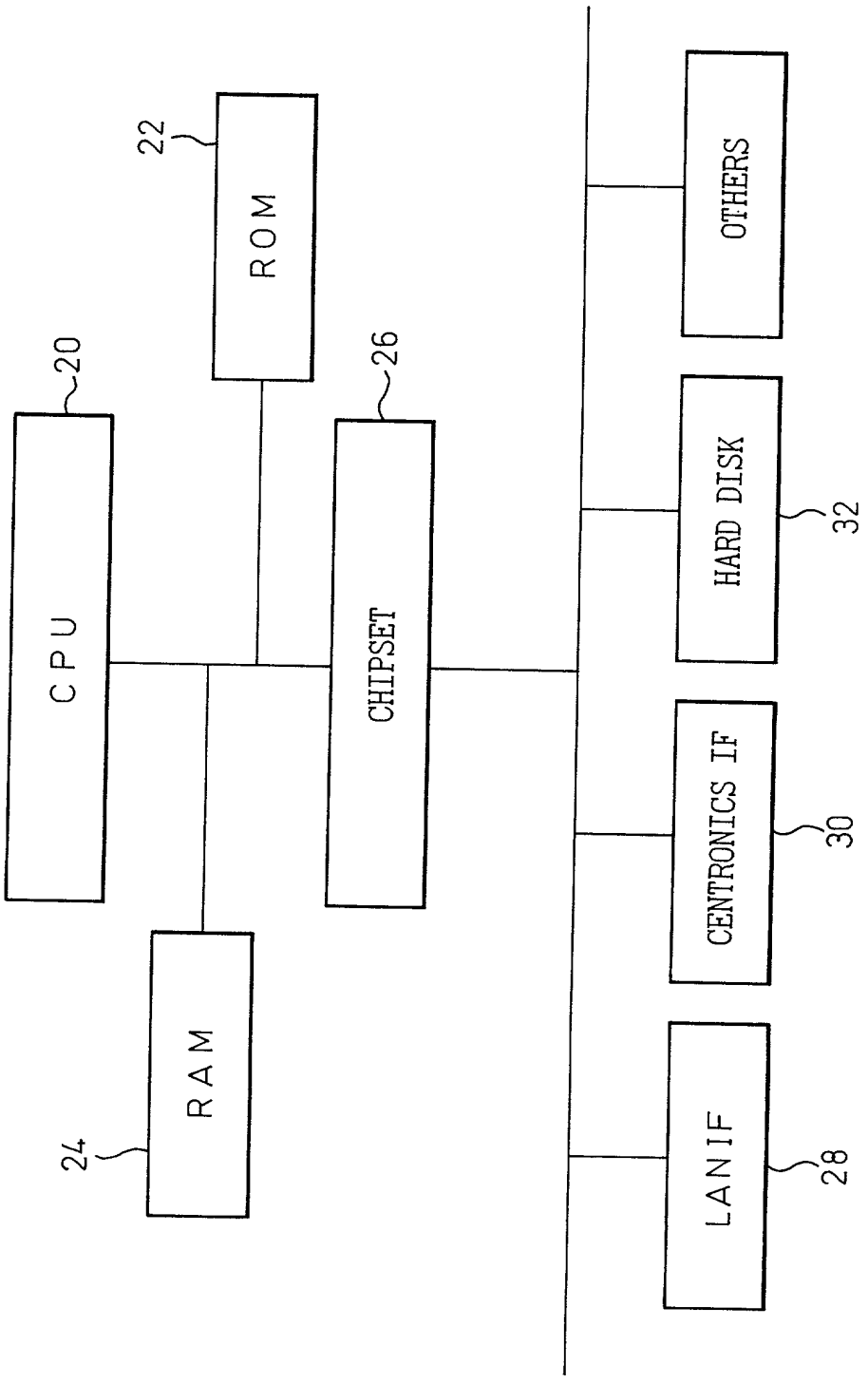


Fig.6

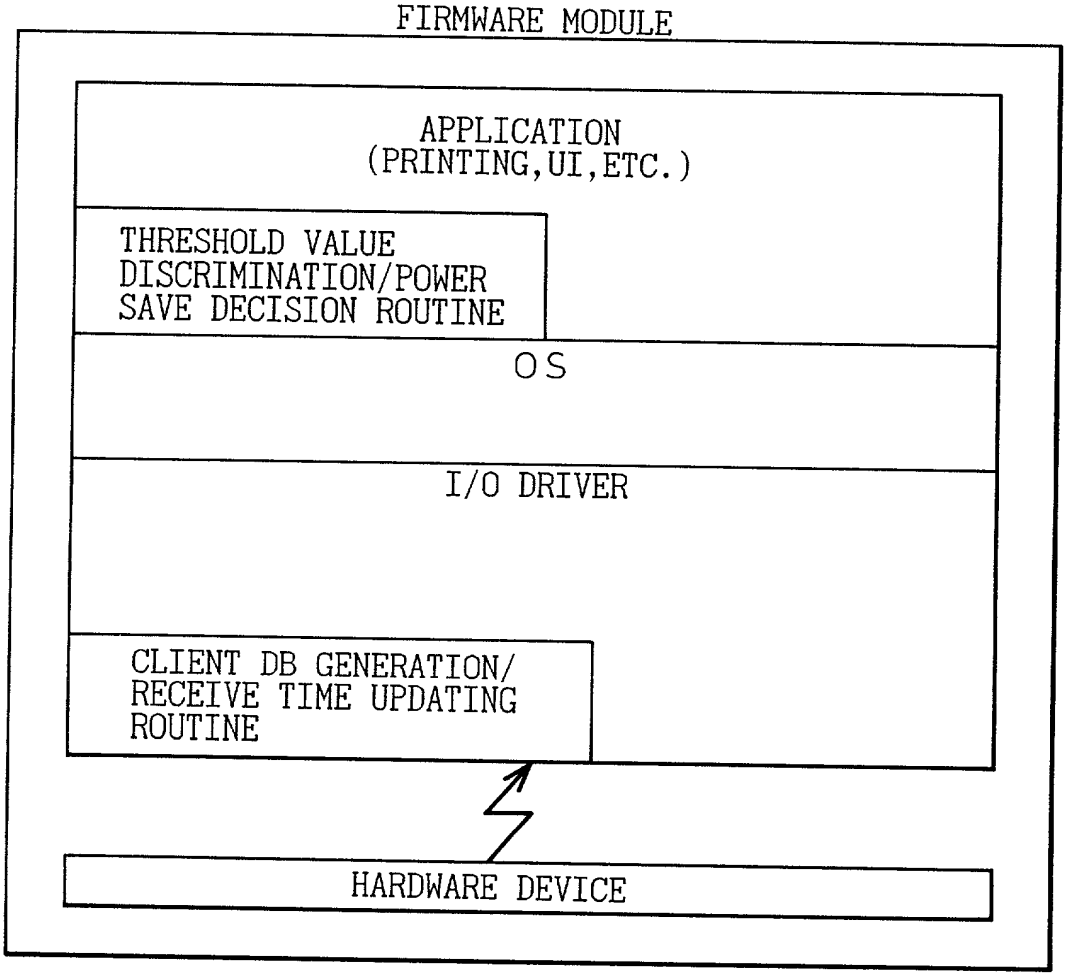

FIRMWARE MODULE
APPLICATION
(PRINTING,UI,ETC.)
THRESHOLD VALUE
DISCRIMINATION/POWER
SAVE DECISION ROUTINE
OS
I/O DRIVER
CLIENT DB GENERATION/
RECEIVE TIME UPDATING
ROUTINE
HARDWARE DEVICE

Fig.7

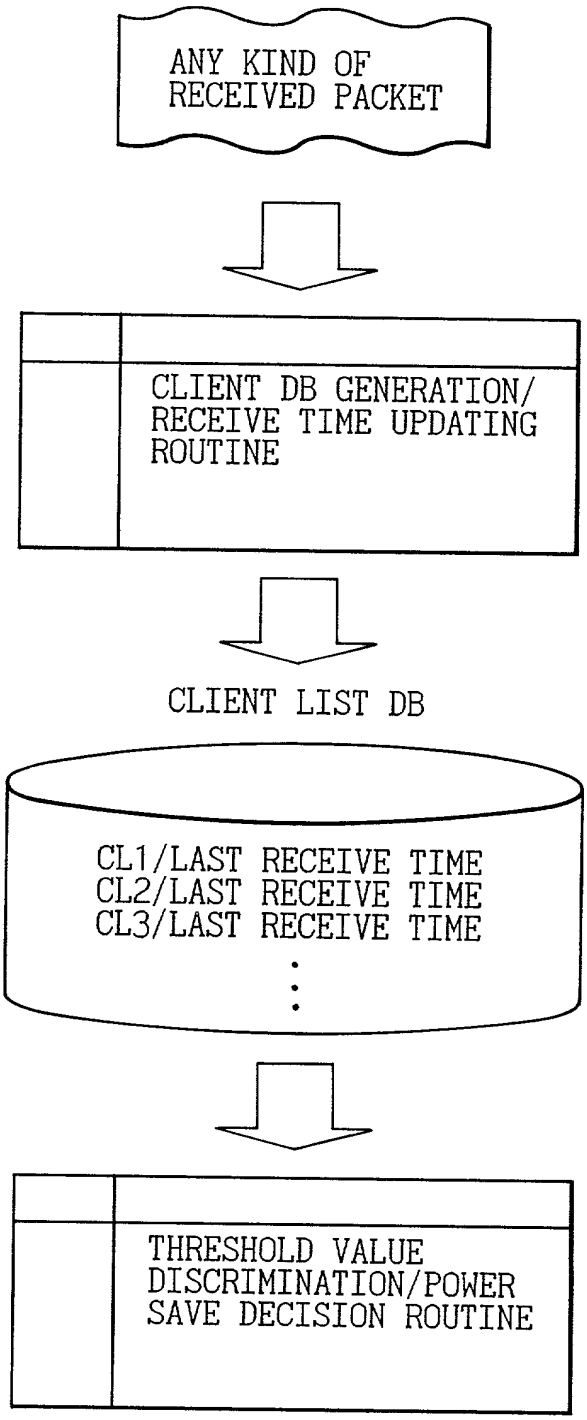

ANY KIND OF
RECEIVED PACKET
CLIENT DB GENERATION/
RECEIVE TIME UPDATING
ROUTINE
CLIENT LIST DB
CL1/LAST RECEIVE TIME
CL2/LAST RECEIVE TIME
CL3/LAST RECEIVE TIME
THRESHOLD VALUE
DISCRIMINATION/POWER
SAVE DECISION ROUTINE

Fig.8

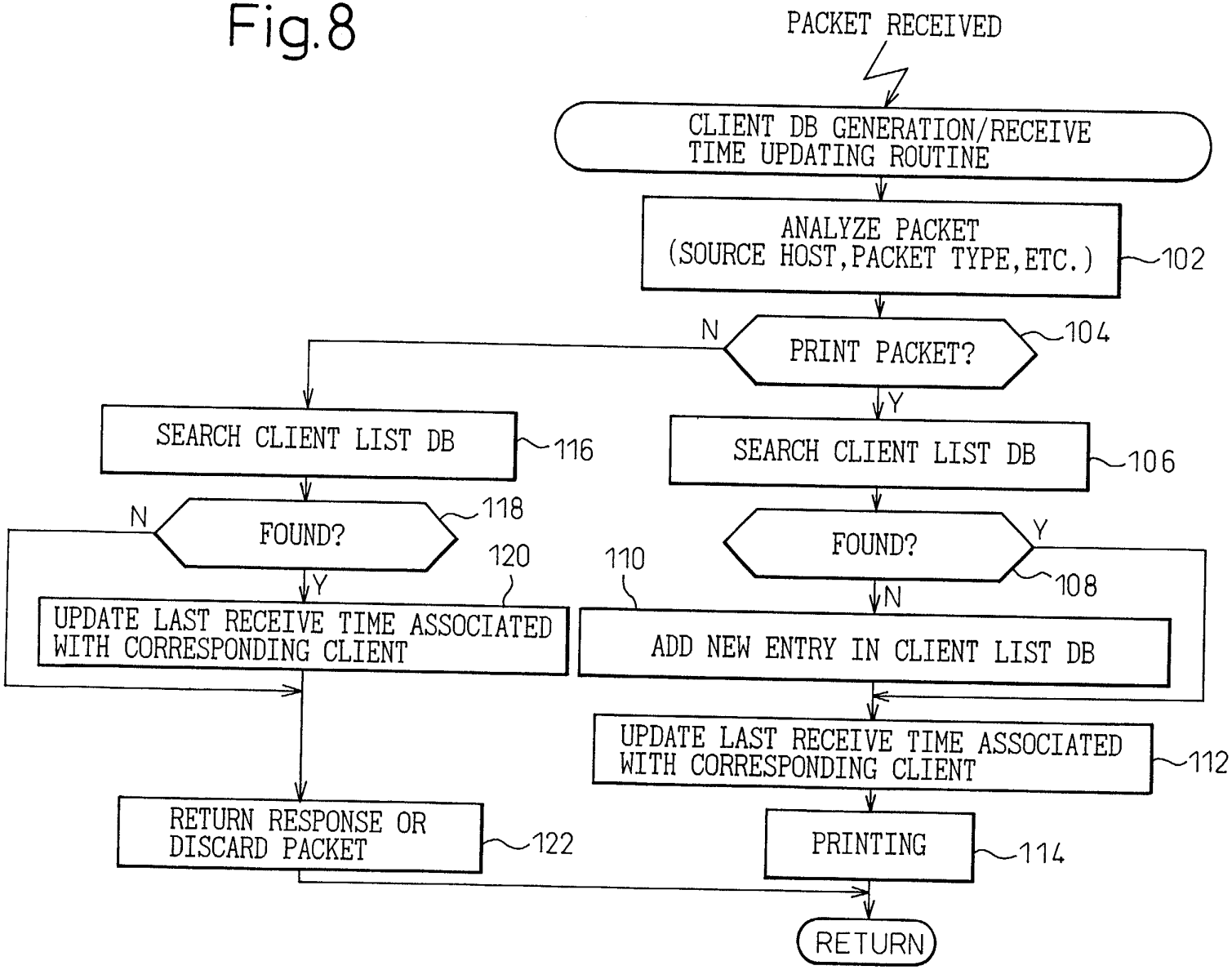

PACKET RECEIVED
CLIENT DB GENERATION/RECEIVE TIME UPDATING ROUTINE
ANALYZE PACKET (SOURCE HOST, PACKET TYPE, ETC.)
102
PRINT PACKET?
104
N
Y
SEARCH CLIENT LIST DB
116
SEARCH CLIENT LIST DB
106
FOUND?
118
FOUND?
108
120
110
UPDATE LAST RECEIVE TIME ASSOCIATED WITH CORRESPONDING CLIENT
ADD NEW ENTRY IN CLIENT LIST DB
UPDATE LAST RECEIVE TIME ASSOCIATED WITH CORRESPONDING CLIENT
112
RETURN RESPONSE OR DISCARD PACKET
122
PRINTING
114
RETURN

Fig.9

Packet 1: 00:80:17:88:2C:B6 -> broadcast
Network: Ethernet
Frame type: 802.3, Frame size: 60
Time: 18h:17m 17.505sec
ARP REQUEST
Hardware Type: [1] ETHERNET, Protocol type: [0800] IP
Source host: 172.22.33.48 <- CL1
Destination host: 172.22.33.55
Source Hardware address: 00:80:17:88:2C:B6
Destination Hardware address: broadcast

Packet 2: 00:90:27:08:20:B2 -> broadcast
Network: Ethernet
Frame type: 802.3, Frame size: 60
Time: 18h:21m 19.999sec
ARP REQUEST
Hardware Type: [1] ETHERNET, Protocol type: [0800] IP
Source host: 172.22.33.100 <- CL2
Destination host: 172.22.33.104
Source Hardware address: 00:90:27:08:20:B2
Destination Hardware address: 00:00:00:00:00:00

Packet 3: 00:A0:C9:6F:5E:2B -> broadcast
Network: Ethernet
Frame type: 802.3, Frame size: 60
Time: 18h:23m 24.797sec
ARP REQUEST
Hardware Type: [1] ETHERNET, Protocol type: [0800] IP
Source host: 172.22.33.121 <- CL3
Destination host: 172.22.33.24
Source Hardware address: 00:A0:C9:6F:5E:2B
Destination Hardware address: 00:00:00:00:00:00

Packet 4: 00:00:0E:6E:04:50 -> broadcast
Network: Ethernet
Frame type: 802.3, Frame size: 60
Time: 18h:29m 25.327sec
ARP REQUEST
Hardware Type: [1] ETHERNET, Protocol type: [0800] IP
Source host: 172.22.33.1 <- SV1
Destination host: 172.22.33.41
Source Hardware address: 00:00:0E:6E:04:50
Destination Hardware address: 00:00:00:00:00:00

Fig.10

Packet 5: 00:A0:C9:6F:5E:2B -> broadcast
Network: Ethernet
Frame type: 802.3, Frame size: 60
Time: 18h:29m 28.960sec
ARP REQUEST
Hardware Type: [1] ETHERNET, Protocol type: [0800] IP
Source host: 172.22.33.121 <- CL3
Destination host: 172.22.33.27
Source Hardware address: 00:A0:C9:6F:5E:2B
Destination Hardware address: 00:00:00:00:00:00

Packet 6: 00:00:0E:6E:04:50 -> broadcast
Network: Ethernet
Frame type: 802.3, Frame size: 60
Time: 18h:33m 30.292sec
ARP REQUEST
Hardware Type: [1] ETHERNET, Protocol type: [0800] IP
Source host: 172.22.33.1 <- SV1
Destination host: 172.22.33.41
Source Hardware address: 00:00:0E:6E:04:50
Destination Hardware address: 00:00:00:00:00:00

Packet 7: 00:80:17:88:2C:B6 -> broadcast
Network: Ethernet
Frame type: 802.3, Frame size: 60
Time: 18h:34m 40.689sec
ARP REQUEST
Hardware Type: [1] ETHERNET, Protocol type: [0800] IP
Source host: 172.22.33.48 <- CL1
Destination host: 172.22.33.55
Source Hardware address: 00:80:17:88:2C:B6
Destination Hardware address: broadcast

Packet 8: 00:80:17:88:2C:B6 -> broadcast
Network: Ethernet
Frame type: 802.3, Frame size: 60
Time: 18h:36m 43.510sec
ARP REQUEST
Hardware Type: [1] ETHERNET, Protocol type: [0800] IP
Source host: 172.22.33.48 <- CL1
Destination host: 172.22.33.55
Source Hardware address: 00:80:17:88:2C:B6
Destination Hardware address: broadcast

Fig.11

CLIENT (ADDRESS)	LAST RECEIVE TIME
CL1 (172.22.33.48)	18h: 36m 43.510sec
CL2 (172.22.33.100)	18h: 21m 19.999sec
CL3 (172.22.33.121)	18h: 29m 28.960sec
CL4 (172.22.33.71)	17h: 29m 28.324sec

Fig.12

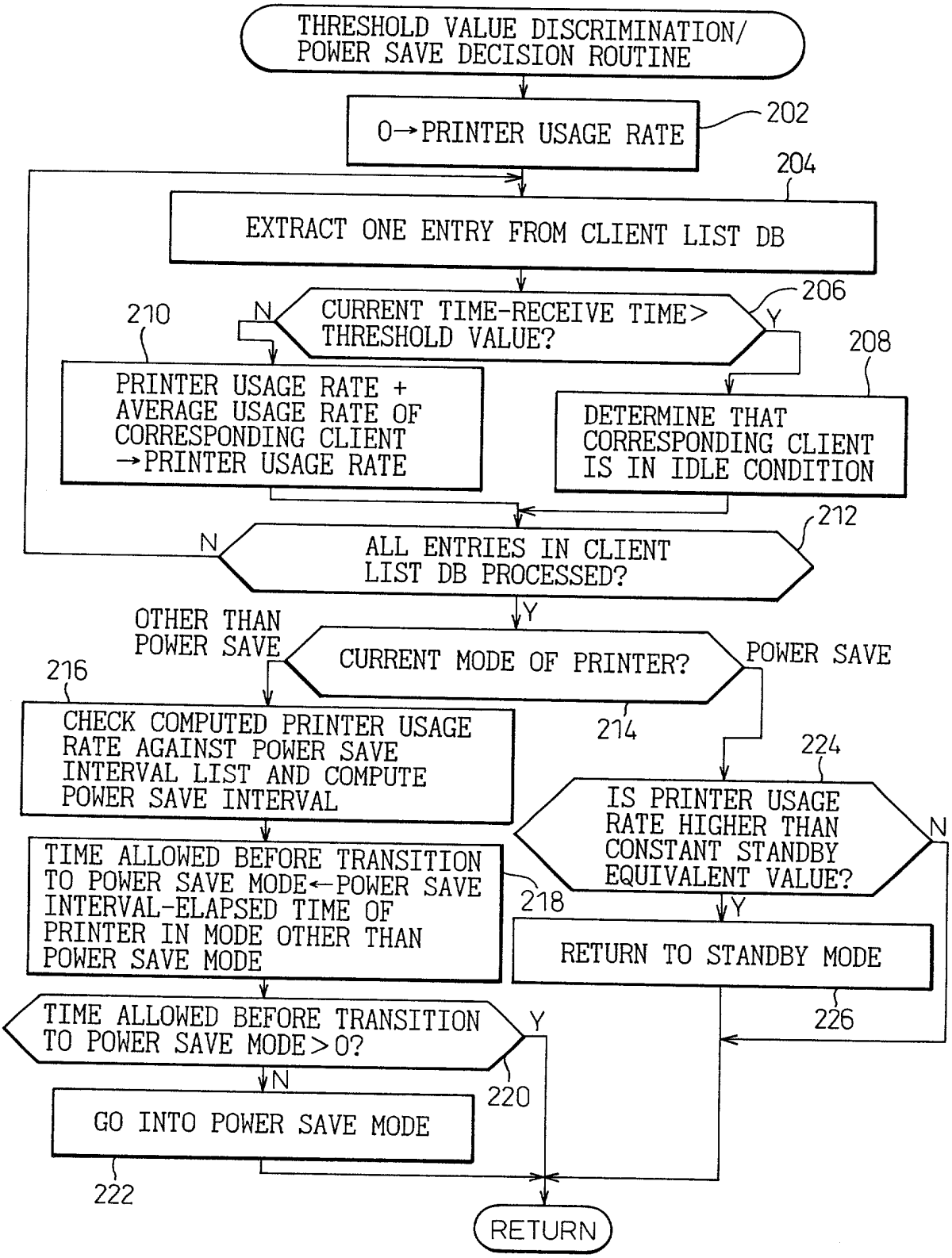

THRESHOLD VALUE DISCRIMINATION/ POWER SAVE DECISION ROUTINE
0→PRINTER USAGE RATE
202
204
EXTRACT ONE ENTRY FROM CLIENT LIST DB
206
CURRENT TIME-RECEIVE TIME> THRESHOLD VALUE?
N
Y
210
PRINTER USAGE RATE + AVERAGE USAGE RATE OF CORRESPONDING CLIENT →PRINTER USAGE RATE
208
DETERMINE THAT CORRESPONDING CLIENT IS IN IDLE CONDITION
212
N
ALL ENTRIES IN CLIENT LIST DB PROCESSED?
Y
OTHER THAN POWER SAVE
CURRENT MODE OF PRINTER?
POWER SAVE
214
216
CHECK COMPUTED PRINTER USAGE RATE AGAINST POWER SAVE INTERVAL LIST AND COMPUTE POWER SAVE INTERVAL
224
IS PRINTER USAGE RATE HIGHER THAN CONSTANT STANDBY EQUIVALENT VALUE?
N
Y
218
TIME ALLOWED BEFORE TRANSITION TO POWER SAVE MODE←POWER SAVE INTERVAL-ELAPSED TIME OF PRINTER IN MODE OTHER THAN POWER SAVE MODE
RETURN TO STANDBY MODE
226
TIME ALLOWED BEFORE TRANSITION TO POWER SAVE MODE>0?
Y
N
220
GO INTO POWER SAVE MODE
222
RETURN

Fig.13

CLIENT	CONDITION (○…WORKING ×…IDLE)
CL1	○
CL2	○
CL3	○
CL4	×
CL5	×
CL6	×
SV1	○

Fig.14

CLIENT	AVERAGE USAGE RATE	
	PR1	PR2
CL1	10	0
CL2	35	0
CL3	40	0
CL4	10	20
CL5	0	25
CL6	0	20
SV1	0	0

UNIT (PAGES/HOUR)

Fig.15

PRINTER USAGE RATE X	POWER SAVE INTERVAL
X>90	CONSTANT STANDBY
90>=X>50	120min
50>=X>10	60min
10>=X	30min
X=0	0min (IMMEDIATELY GOES INTO POWER SAVE MODE)